

APPLICATION UNDER UNITED STATES PATENT LAWS

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Invention: ID CARD-MAKING APPARATUS, ID CARD-MAKING METHOD, AND ID CARD

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This is a:

- ☐ Provisional Application
- ☒ Regular Utility Application
- ☐ Continuing Application
 - ☒ The contents of the parent are incorporated by reference
- ☐ PCT National Phase Application
- ☐ Design Application
- ☐ Reissue Application
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SPECIFICATION

TITLE OF THE INVENTION

ID CARD-MAKING APPARATUS, ID CARD-MAKING METHOD, AND ID CARD

CROSS-REFERENCE TO RELATED APPLICATIONS

5 This application is based upon and claims the benefit of priority from the prior Japanese Patent Application No. 11-364570, filed December 22, 1999, the entire contents of which are incorporated herein by reference.

10 BACKGROUND OF THE INVENTION

 The present invention relates to an ID card with a figure image. The present invention also relates to an apparatus and a method for making such a card.

 An ID card-making apparatus reads a photograph
15 from a predetermined photograph attachment position on an ID card application form, and records or prints that photographic image on an ID card, along with the related personal information, such as the name, the address and the date of birth.

20 It should be noted, however, that the photograph is not necessarily attached accurately at the predetermined position. It may happen that the photograph is shifted from the predetermined position. If the photograph is read without this being considered,
25 and the resultant image is attached to the ID card (e.g., by printing), the image may include a photograph edge or include part of a ruled line or characters on

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(2) An ID card-making apparatus and an ID card-making method capable of making an ID card that cannot be easily forged.

(4) An ID card that cannot be easily forged.

(1) The ID card-making apparatus of the present invention comprises: image reading means for reading an image from an area that is large enough to include a photograph of predetermined size attached to a predetermined application form; photograph position detection means for detecting a photograph edge from image data obtained by the image reading means; photographic image extraction means for extracting a photographic image from an area which is inside a region defined by the photograph edge detected by the

photograph position detection means and which does not include the photograph edge; figure image extraction means for extracting a figure portion from the photographic image extracted by the photographic image extracting means; background image storage means for storing background image data; image synthesis means for producing a composite image by synthesizing the background image data stored in the background image with figure portion data extracted by the figure image extraction means; and card-making means for making an ID card to which the composite image produced by the image synthesis means is attached.

(2) The ID card-making method of the present invention comprises: an image reading step for reading an image from an area that is large enough to include a photograph of predetermined size attached to a predetermined application form; a photograph position detection step for detecting a photograph edge from image data obtained in the image reading step; a photographic image extraction step for extracting a photographic image from an area which is inside a region defined by the photograph edge detected in the photograph position detection step and which does not include the photograph edge; a figure image extraction step for extracting a figure portion from the photographic image extracted in the photographic image extracting step; an image synthesis step for producing

5 a composite image by synthesizing background image data stored beforehand with figure portion data extracted in the figure image extraction step; and a card-making step for making an ID card to which the composite image produced in the image synthesis step is attached.

10 (3) The ID card of the present invention bears a composite image that is made by: reading an image from an area that is large enough to include a photograph of predetermined size attached to a predetermined application form; detecting a photograph edge from obtained image data; extracting a photographic image from an area which is inside a region defined by the detected photograph edge and which does not include the photograph edge; extracting figure portion data from 15 the extracted photographic image; and producing a composite image by synthesizing background image data stored beforehand with the extracted figure portion data.

20 Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instrumentalities and 25 combinations particularly pointed out hereinafter.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

The accompanying drawings, which are incorporated

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in and constitute a part of the specification,
illustrate presently preferred embodiments of the
invention, and together with the general description
given above and the detailed description of the
5 preferred embodiments given below, serve to explain the
principles of the invention.

FIG. 1 is a block diagram illustrating a schematic
structure of an ID card-making apparatus according to
embodiment 1 of the present invention.

10 FIG. 2 is a flowchart showing how an ID card is
made by the ID card-making apparatus according to
embodiment 1 of the present invention.

FIG. 3 is a block diagram illustrating a schematic
structure of an ID card-making apparatus according to
15 embodiment 2 of the present invention.

FIG. 4 is a flowchart showing how an ID card is
made by the ID card-making apparatus according to
embodiment 2 of the present invention.

FIG. 5 illustrates an image reading size used by
20 the ID card-making apparatuses shown in FIGS. 1 and 3.

FIG. 6 shows a background image which the ID card-
making apparatus of FIG. 3 attaches to an ID card, for
the purpose of preventing forgery.

FIGS. 7A to 7C illustrate problems of a
25 conventional ID card-making apparatus.

DETAILED DESCRIPTION OF THE INVENTION

Embodiments 1 and 2 of the present invention will

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now be described with reference to the accompanying drawings.

FIG. 1 is a block diagram illustrating a schematic structure of an ID card-making apparatus according to embodiment 1 of the present invention. FIG. 2 is a flowchart showing how an ID card is made by the ID card-making apparatus according to embodiment 1 of the present invention. With reference to these Figures, a description will be given of the ID card-making apparatus of embodiment 1 and of the manner in which the apparatus makes an ID card.

As shown in FIG. 1, the ID card-making apparatus of embodiment 1 comprises a photographing device 1 and an ID card-making section 3. The photographing device 1 and the ID card-making section 3 are connected to each other by means of a communication line 4.

The photographing device 1 includes a camera 11, an image processor 12 and a controller 13. The image processor 12 is made up of a photograph position detector 121, a photographic image extraction section 122 and an image enlargement processor 123.

The photographing device 1 is provided with an application form processing mechanism (not shown). This application form processing mechanism receives application forms, conveys them to a predetermined area one by one, and finally discharges them from inside the photographing device 1. The camera 11 takes a picture

of the photograph attached to the application forms conveyed by the application form processing mechanism, so as to obtain image data on a facial portrait. The application forms have a photograph attachment portion of predetermined size. On the basis of the position of the photograph attachment portion of an application form, the camera 11 reads an image from a certain area (Step ST1). This area is large enough to include a photograph of predetermined size attached to the application form. FIG. 5 shows how the image is read. As is clear from FIG. 5, the camera 11 reads the predetermined-size photograph 51 pasted to the photograph attachment portion on the basis of a read size 52, which is greater than the photograph 51. Step ST1 corresponds to the image reading step.

The photograph position detector 121, which serves as a photograph position detecting means, detects a photograph portion from image data obtained by the image reading operation by the camera 11. In other words, the photograph position detector 121 detects a photograph edge 53 from the image data (Step ST2). Step ST2 corresponds to the photograph position detection step. For example, the photograph position detector 121 is provided with a filter capable of detecting vertical and horizontal components of image data. By merely entering photograph size to the photograph position detector 121, the vertical and

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horizontal dimensions of a photograph edge can be
estimated to a certain extent. To be more specific,
the vertical and horizontal components detected by the
filter are compared with the estimated vertical and
horizontal dimensions of a photograph edge. Based on
this comparison, a photograph edge can be derived from
the image data. The photographic image extraction
section 122, which serves as a photographic image
extraction means, extracts a photographic image 54 from
the image detected by the photograph position detector
121, in such a manner that the extracted photographic
image 54 has such size as excludes the photograph edge
53 (Step ST3). In other words, the photographic image
is extracted from inside the region defined by the
detected photograph edge in such a manner that the
extracted photographic image does not contain the
photograph edge. Step ST3 corresponds to the
photographic image extraction step. The image
enlargement processor 123 enlarges the photographic
image 54 extracted by the photographic image extraction
section in such a way that the enlarged photographic
image 54 has predetermined size.

The controller 13 controls the entire
photographing device 1. For example, the controller 13
controls the operation of transferring a photographic
image to the ID card-making section 3 through the
communication line 4. The photographic image is either

the image extracted by the photographic image extraction section 122 or the image enlarged by the image enlargement processor 123.

5 The ID card-making section 3 is provided with data regarding personal information to be recorded in the ID card. The data on the personal information is supplied from an external device (e.g., a keyboard) through the communications line 4. The ID card-making section 3 receives a photographic image which is transferred
10 thereto from the photographing device by way of the communication line 4 and for which predetermined correction, such as background processing, has been executed. The ID card-making section 3 records the photographic image and the corresponding personal
15 information on the ID card (Step ST4). Hence, the photographic image which the ID card-making section 3 attaches to the ID card is suitable for the certification purpose. To be more specific, the photographic image includes neither a photograph edge
20 nor a ruled line or characters printed on the application form.

25 The above description was given, referring to the case where the photographing device 1 is provided with the image processor 12. Instead of this structure, a structural element that is equivalent in function to the image processor 12 may be provided for the ID card issuing section 3.

FIG. 3 is a block diagram illustrating a schematic structure of an ID card-making apparatus according to embodiment 2 of the present invention. FIG. 4 is a flowchart showing how an ID card is made by the ID card-making apparatus according to embodiment 2 of the present invention. With reference to FIGS. 3 and 4, a description will be given of the ID card making-apparatus of embodiment 2 and of the manner in which the apparatus makes a card.

As shown in FIG. 3, the ID card-making apparatus of embodiment 2 of the present invention is provided with a photographing device 1 and an ID card-making section 3. The photographing device 1 and the ID card-making section are connected together by means of a communication line 4. Of the structural components of the apparatus of embodiment 2, those which are similar to the structural components of the apparatus of embodiment 1 will be described in a simplified manner, or reference to such structural components will be omitted.

The photographing device 1 is provided with a camera 11, an image processor 12 and a controller 13. The image processor 12 includes a photograph position detector 121, a photographic image extraction section 122, an image enlargement processor 123, a figure image extraction section 124, a background image synthesis section 125, and a background image storage section 126.

5 camera 11 takes a picture of the photograph attached to
an application form conveyed by the application form
processing mechanism, so as to obtain image data on a
facial portrait. On the basis of the position of the
photograph attachment portion of an application form,
10 the camera 11 reads an image from a certain area (Step
ST11). This area is large enough to include a
photograph of predetermined size attached to the
photograph attachment portion. The read size of the
camera 11 is determined in the same manner as described
15 in relation to embodiment 1. Step ST11 corresponds to
the image reading step.

The photograph position detector 121, which serves as a photograph position detecting means, detects a photograph portion from image data obtained by the image reading operation by the camera 11. In other words, the photograph position detector 121 detects a photograph edge 53 from the image data (Step ST12). Step ST12 corresponds to the photograph position detection step. For example, the photograph position detector 121 is provided with a filter capable of detecting vertical and horizontal components of image data. By merely entering photograph size to the

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photograph position detector 121, the vertical and horizontal dimensions of a photograph edge can be estimated to a certain extent. To be more specific, the vertical and horizontal components detected by the filter are compared with the estimated vertical and horizontal dimensions of a photograph edge. Based on this comparison, a photograph edge can be derived from the image data. The photographic image extraction section 122, which serves as a photographic image extraction means, extracts a photographic image 54 from the image detected by the photograph position detector 121, in such a manner that the extracted photographic image 54 has such size as excludes the photograph edge 53 (Step ST13). In other words, the photographic image is extracted from inside the region defined by the detected photograph edge in such a manner that the extracted photographic image does not contain the photograph edge. Step ST13 corresponds to the photographic image extraction step. The image enlargement processor 123 enlarges the photographic image 54 extracted by the photographic image extraction section 122 in such a way that the enlarged photographic image 54 has predetermined size.

The figure image extraction section 124, which serves as a figure image extraction means, extracts a figure-image portion (e.g., an image of the upper half body of a person, an image of the face of the person,

or the like) from the edge-removed photographic image
(e.g., a photographic image which is enlarged and from
which the edge is removed) (Step ST14). In other words,
only the figure portion is extracted from the edge-
5 removed photographic image by cutting out the
background image. For this extraction, figure edge
detection or contrast detection may be used. This step
corresponds to a figure image extraction step. The
background image storage section 126, which serves as a
10 background image storage means, stores a predetermined
background image (e.g., a blue background). The
background image synthesis section 125, which serves as
an image synthesis means, synthesizes a figure image
extracted by the figure image extraction section 124
15 with the background image data stored in the background
image storage section 126, thereby producing a
composite image (Step ST15). This step corresponds to
the image synthesis step. The controller 13 controls
the entire photographing device 1. For example, the
20 controller 13 controls the operation of transferring
the composite image, made by the figure image synthesis
section 125, to the ID card-making section 3 through
the communication line 4.

The ID card-making section 3 is provided with data
25 regarding personal information to be recorded in the ID
card. The ID card-making section 3 records the
composite image (which is supplied thereto from the

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the right position, it should not be read based on the read size 82 described above. If it is read in the manner shown in FIG. 7C, what the resultant photographic image 83 shows is shifted from the center of the original image and is therefore inappropriate for the certification purpose.

The ID card-making apparatus of the present invention reads an image by use of a read size greater than a predetermined size, detects a photograph edge from the image data obtained by reading the image, extracts a photographic image that does not include the detected photograph edge, and processes the extracted photographic image as a photograph used for certification. Accordingly, the ID card-making apparatus of the present invention solves the problems of the conventional apparatus.

According to the present invention, it is possible provide an ID card-making apparatus, an ID card-making method, and an ID card that are outlined below.

(1) An ID card-making apparatus and an ID card-making method capable of making an ID card which bears a photographic image appropriate for the certification purpose, and which is made without being adversely affected by the difference between the photograph attachment position on an application form and the actual position of a photograph and the difference between the desirable photograph size and the actual

photograph size.

(2) An ID card-making apparatus and an ID card-making method capable of making an ID card that cannot be easily forged.

5 (3) An ID card which bears a photographic image appropriate for the certification purpose, and which is made without being adversely affected by the difference between the photograph attachment position on an application form and the actual position of a
10 photograph and the difference between the desirable photograph size and the actual photograph size.

(4) An ID card that cannot be easily forged.

Additional advantages and modifications will readily occur to those skilled in the art. Therefore,
15 the invention in its broader aspects is not limited to the specific details and representative embodiments shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as
20 defined by the appended claims and their equivalents.

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